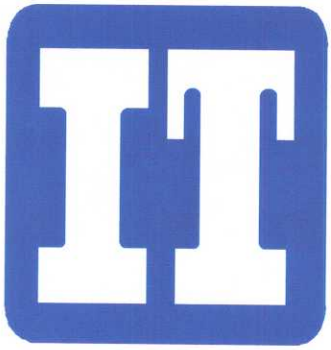
FINAL REPORT
CDRL A030
WETLANDS MITIGATION FOR LANDFILL 3
AT
KEESLER AFB, MISSISSIPPI

Prepared for

AIR FORCE CENTER
FOR ENVIRONMENTAL EXCELLENCE

CONTRACT No. F41624-94-D-8106
DELIVERY ORDER No. 0089



IT CORPORATION
A Member of the IT GROUP

11560 Great Oaks Way, Suite 500
Alpharetta, GA 30022

OHM Remediation Services Corp.
11560 Great Oaks Way, Suite 500
Alpharetta, GA 30022-2424
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A Member of The IT Group

the IT group

October 30, 2000

Ms. Audrey Schoellman
HSC/PKVBB
3207 North Road
Brooks AFB, TX 78235-5363

RE: Contract No. F41624-94-D-8106
Delivery Order No. 0089
Final Report, CDRL A030
Wetlands Mitigation for Landfill 3 Site

Dear Ms. Schoellman:

Attached please find IT Corporation's (IT) submittal for the Final Report, CDRL A030 as specified by Paragraph 3.1.3.2.h, Technical Report, of the Statement of Work Remedial Action for Project MAHG 1998-7404 Wetlands Mitigation for Landfill 3 at Keesler AFB, Mississippi dated February 23, 1998.

Sincerely,

IT CORPORATION

David B. Tester, P.E.
Senior Project Manager

Copy to:
AFCEE/ERD (2)
AFCEE MSI (LT)
Base POC (5)
Project File 920568

FINAL REPORT
CDRL A030
WETLANDS MITIGATION FOR LANDFILL 3
AT
KEESLER AFB, MISSISSIPPI

Contract No. F41624-94-D-8106
Delivery Order No. 0089

Prepared for:

The Air Force Center for Environmental Excellence (AFCEE)

Submitted by:

IT Corporation
11560 Great Oaks Way, Suite 500
Alpharetta, GA 30022

IT Corporation Project No. 920568
Revision No. 0

October 2000

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1.0 INTRODUCTION

IT Corporation (IT), formerly OHM Remediation Services, under contract to the Air Force Center for Environmental Excellence (AFCEE), has prepared this Final Report to describe the activities associated with the creation of wetlands as part of the required mitigation for the Landfill 3 (LF3) construction project at Keesler AFB, Mississippi. The IT scope of work included preparation of a wetlands mitigation plan, a topographical survey of the mitigation area, grading of approximately one half acre of coastal land to the level of the surrounding wetlands and replanting the mitigation area with tidal marsh vegetation. This work was performed utilizing the Department of the Air Force, Full Service Remedial Action Contract (RAC), Contract No. F41624-94-D-8106, Delivery Order No. 0089. IT has prepared this Final Report in accordance with the Department of the Air Force's "*Statement of Work Remedial Action for Project MAHG 1998-7404 Wetlands Mitigation for Landfill 3 at Keesler AFB, Mississippi*" dated February 23, 1998.

2.0 SCOPE OF WORK

As part of this delivery order IT completed the following tasks:

- Provided all labor, material, equipment and supervision to create wetlands as part of the required mitigation for the construction project at LF3.
- Provided a wetlands mitigation plan
- Provided a topographical survey of the mitigation area
- Excavated one half acre of coastal land to the level of the surrounding wetlands and disposed of the material at the LF3 site
- Revegetated the mitigation area with tidal marsh grass
- Performed an annual evaluation of the mitigation area
- Reworked the mitigation area to provide mounds and additional plants in low areas
- Demobilized after site rework

The Scope of Work was conducted in accordance with the following:

- Department of the Air Force, Full Service Remedial Contract, Contract No. F41624-94-D-8106, Delivery Order No. 0089
- Statement of Work Remedial Action for Project MAGH 1998-7404 Wetland Mitigation for Landfill 3 at Keesler AFB, Mississippi dated February 23, 1998.
- Keesler AFB Application for Department of the Army Permit to Fill Wetlands, Section 4.5, Mitigation Measures
- Department of the Army Permit Number MSNW97-02035-V, June 13, 1997 Program

- Mississippi Department of Marine Resources (DMR) Certificate of Waiver, DMR-M 9705590-W, June 26, 1997

- OHM Remediation Services Corp. Environmental Cleanup Work Plan prepared for *The Interim Stabilization Measure at Landfill 3 Site (SWMU 9) Keesler Air Force Base Biloxi, Mississippi*

- OHM Remediation Services Corp. Health and Safety Plan prepared for *The Interim Stabilization Measure at Landfill 3 Site (SWMU 9) Keesler Air Force Base Biloxi, Mississippi*

- OHM Remediation Services Corp. Construction Quality Plan prepared for *The Interim Stabilization Measure at Landfill 3 Site (SWMU 9) Keesler Air Force Base Biloxi, Mississippi*

3.0 SITE DESCRIPTION

Keesler AFB is located within the city limits of Biloxi, Mississippi, approximately 80 miles east of New Orleans, Louisiana, and 60 miles west of Mobile, Alabama as shown on Figure 1.1. It is bordered on the north by the Back Bay of Biloxi (Back Bay) and on the west, south, and east by residential and commercial areas of the city. The Mississippi Sound is located approximately 0.5 miles south of the Base. The location of Keesler AFB is shown in Figure 1.2. The Base is comprised of 1,494 acres of federally owned land and 117 acres of leased, permitted, and easement lands. Two remote installation facilities (Training Annex No. 1 and the Small Arms Range Annex) are also associated with the Base.

Keesler AFB was activated in June 1941 as a training center for aircraft mechanics. A small public airfield occupied the area before the use of the site by the U.S. Air Force (USAF). After World War II, Keesler AFB was designated as a permanent military base. Electronics, communications, personnel, and pilot training programs were later added to the existing training programs. The current mission of Keesler AFB focuses on four main areas: technical training, medical care, flying operations, and support. The Base also includes electronics, communications, and personnel training schools.

3.1 Landfill 3 Site

The Landfill 3 (LF3) site consists of a small peninsula on the northern edge of the Base shown in Figure 2.1. Filling in marshland in the Back Bay of Biloxi with native soil, refuse, construction debris, and asphalt created the landfill. The surface of the landfill was used for temporary storage of asphalt debris, sand bags, fill dirt, and concrete rubble. Interim measures to stabilize LF3 through physical containment have been completed at the site. Construction of the containment required filling of a portion of wetlands around the site. In accordance with Department of the Army Permit Number MSNW97-02035-V and Mississippi Department of Marine Resources (DMR) Certificate of Waiver DMR-M 9705590-W, compensatory mitigation was to be coordinated with DMR and conducted in accordance with Section 4.5 of the Keesler AFB permit application.

3.2 Archery Range

The archery range is a bump on the northern edge of the Base adjacent to LF3 that was developed to create wetlands as part of the required mitigation for the construction project at

the landfill site. Filling marshland in the Back Bay of Biloxi with native soil, shell fragments, and grass cuttings from the golf course created the archery range. The one half acre archery range site was to be excavated and rough graded to the elevation of the surrounding wetlands and vegetation that was the same type as that located on either side of the range was to be planted.

Figure 1.1 Regional Location Map

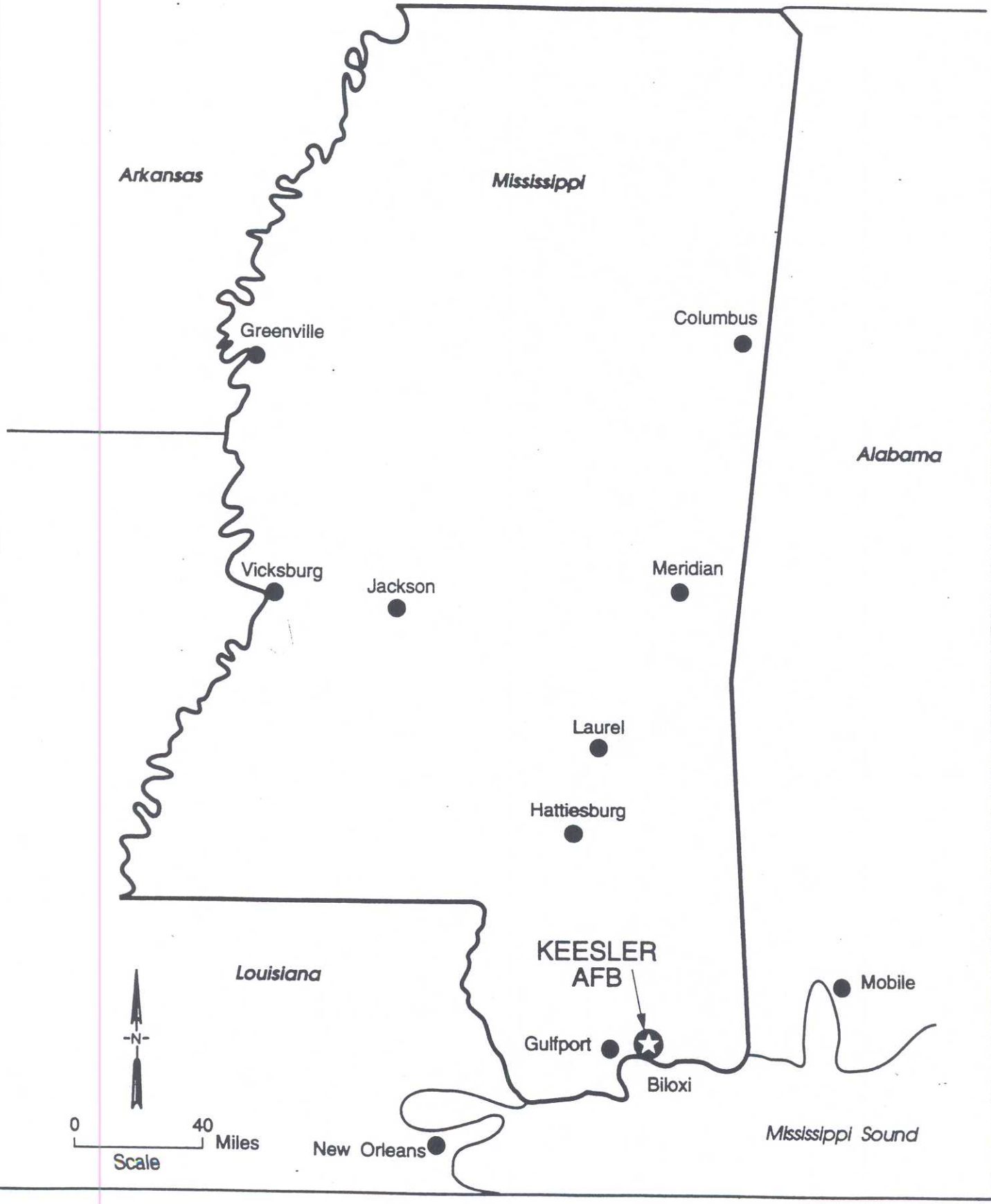
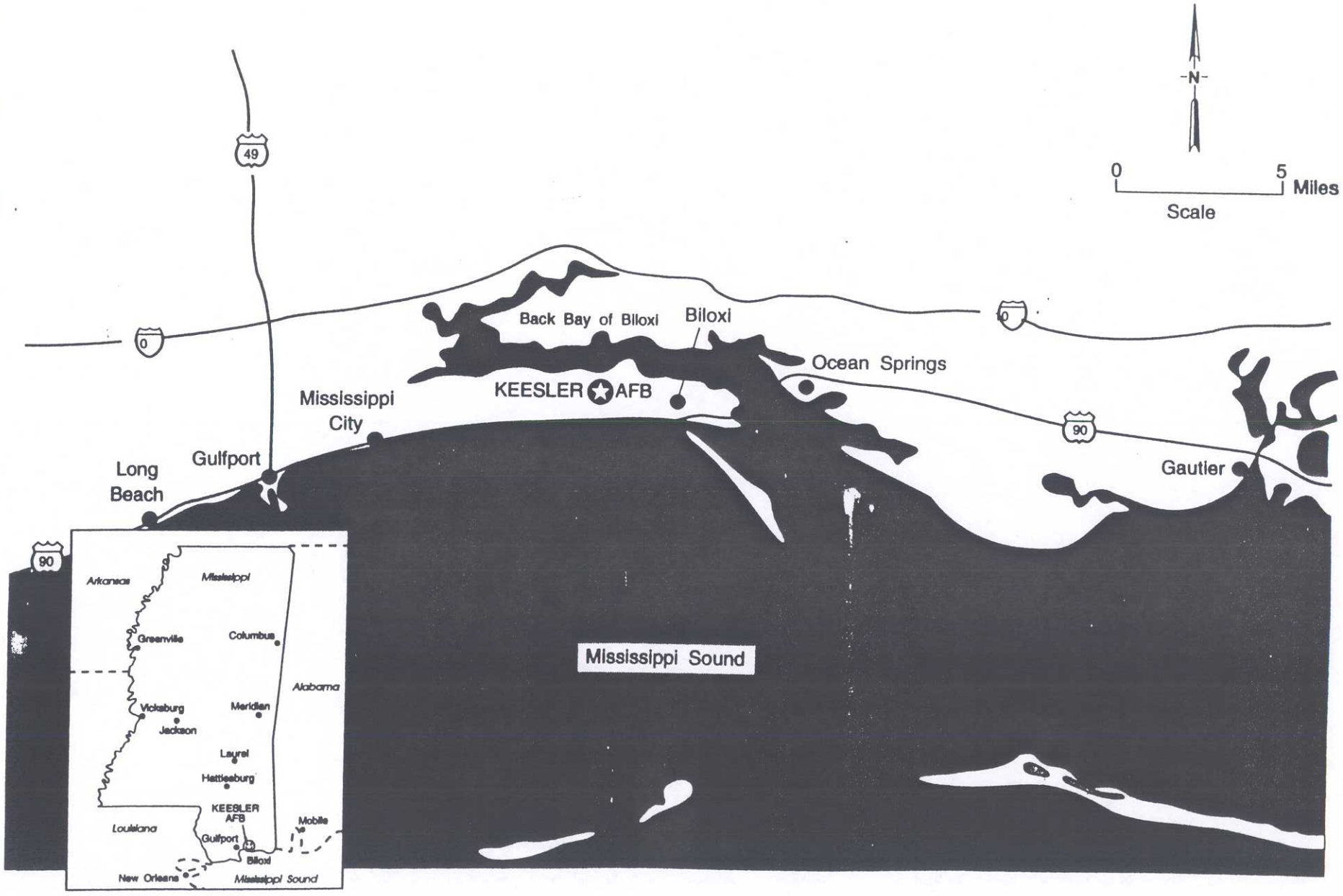


Figure 1.2 Facility Location Map

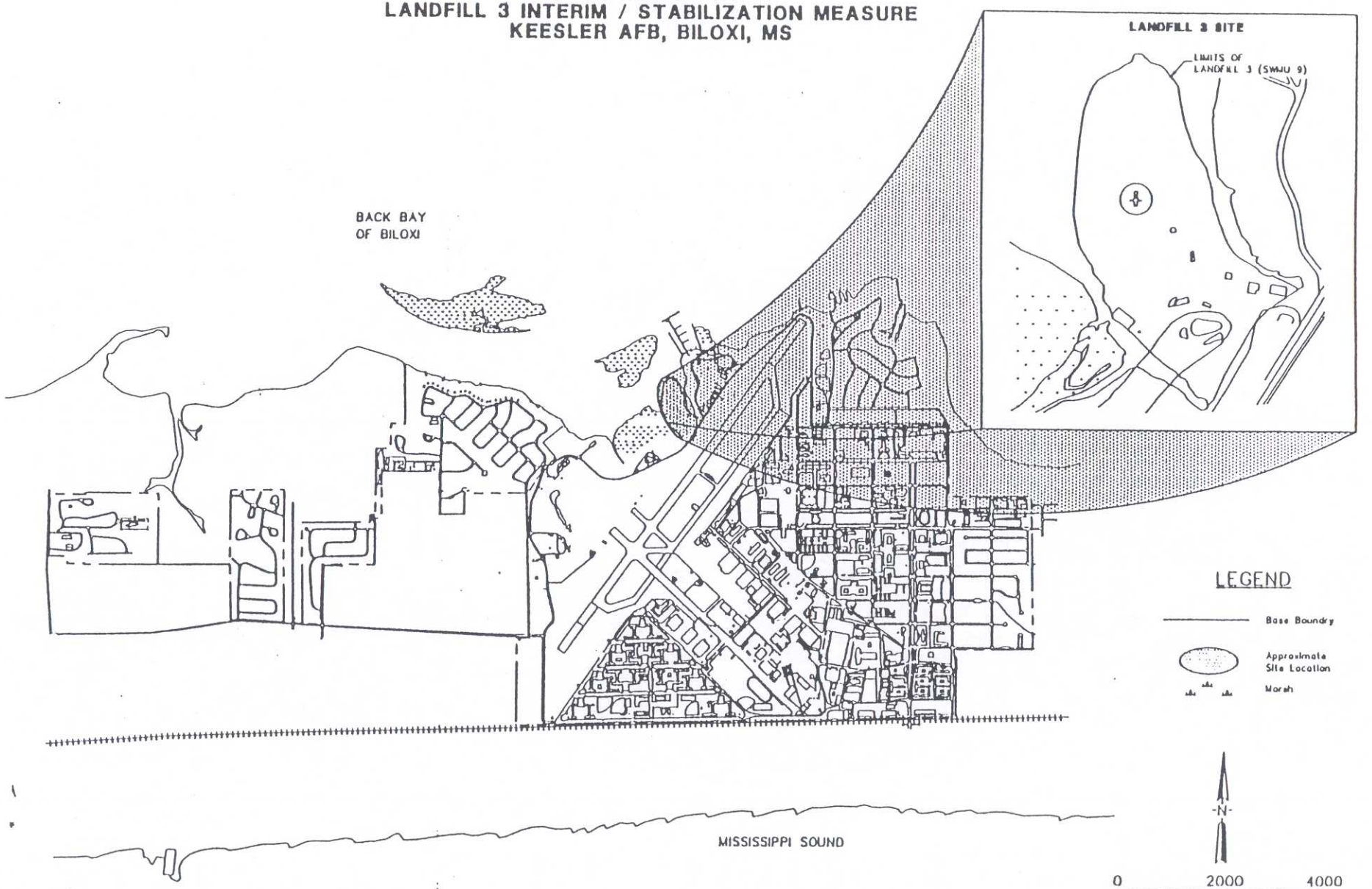


Source: Commercial Road Map

FIGURE 2.1

LOCATION AND LAYOUT OF LANDFILL 3

LANDFILL 3 INTERIM / STABILIZATION MEASURE
KEESLER AFB, BILOXI, MS



4.0 FIELD ACTIVITES

The following sections describe the field work activities for this project.

4.1 Topographical Survey

A topographical survey was completed by Moran, Seymour & Associates of the archery range that also identified types of trees and vegetation in the area on November 11, 1998 and is presented in Appendix A.

4.2 Wetlands Delineation

Knesal Engineering with Enviro South completed the wetland delineation on December 2, 1998 that evaluated the existing soils and vegetation for the archery range. A report was submitted to IT on December 3, 1998. The report provided details for the extent of the archery range fill to be removed to create the wetlands. The edges of the area to be excavated were flagged by Enviro South to show the limits of the fill to be removed. The wetland delineation report is presented in Appendix B.

4.3 Excavation and Grading of the Archery Range

Excavation of the archery range to create wetlands began on December 28, 1998. IT encountered large quantities of concrete and asphalt rubble that had been used as fill material. Concrete, asphalt and fill material were hauled to LF3 and used as general fill. December 29, 1998 IT continued excavation of the archery range and encountered seventeen (17) creosote pilings that had been driven for a foundation. IT was unable to remove the pilings with the equipment on site and with concurrence from the Team Chief and Base Point of Contact the pilings were left in place and the fill material around them was excavated. December 30, 1998 IT continued excavation of the archery range and encountered two large triangular shaped pieces of concrete approximately eighteen (18) inches thick. The concrete was unable to be removed with the equipment on site. With concurrence from the Team Chief and Base Point of Contact the concrete was left in place and the fill material around the pieces was removed. December 31, 1998 IT completed the excavation of the fill that had been identified to bring the archery range to the elevation of the surrounding wetlands. Excavated material from the archery range was hauled to LF3 and disposed of as general fill.

Mitigation area looking toward the Back Bay

Mitigation area prior to revegetation at high tide looking toward the Back Bay

Concrete slab and pilings in the mitigation area at high tide looking toward the Back Bay

Concrete slab in the mitigation area prior to revegetation at high tide looking east

4.4 Planting of the Mitigation Area

The project specifications and the wetland delineation report both confirmed the native plants that were to be used to revegetate the mitigation area. IT also consulted the Gulf Coast Research Laboratory for types of native plants and numbers of plants per square foot to arrive at the quantity of plants necessary to revegetate the mitigation area estimated at slightly less than twenty two thousand (22,000) square feet. Fifteen thousand (15,000) Black Needle Rush (*Juncus roemerianus)* and five thousand (5,000) Smooth Cord Grass (*Spartina alterniflora*) plants in two inch liners were ordered from Horticultural Systems Inc of Parrish Florida on January 13, 1999. Delivery of the plants to the site was delayed until September of 1999 due to a delay in the design because of differing site conditions and the demobilization of the LF3 project. IT received five thousand (5,000) Smooth Cord Grass plants and five thousand (5,000) Black Needle Rush plants on September 10, 1999. Instructions from Horticultural Systems on how to plant the plants were requested. IT was told to create a hole with a post hole digger or other implement to allow the root ball of the plants to be buried and covered. September 11, 1999 IT completed planting the first ten thousand plants. September 20, 1999 IT received ten thousand Black Needle Rush plants and continued planting. Concrete was encountered below the mud line so an adjustment in the plant spacing was made to avoid the concrete. September 21, 1999 IT continued planting the Black Needle Rush plants. September 22, 1999 IT completed planting the Black Needle Rush plants, removed empty boxes and debris from the area and demobilized from the site.

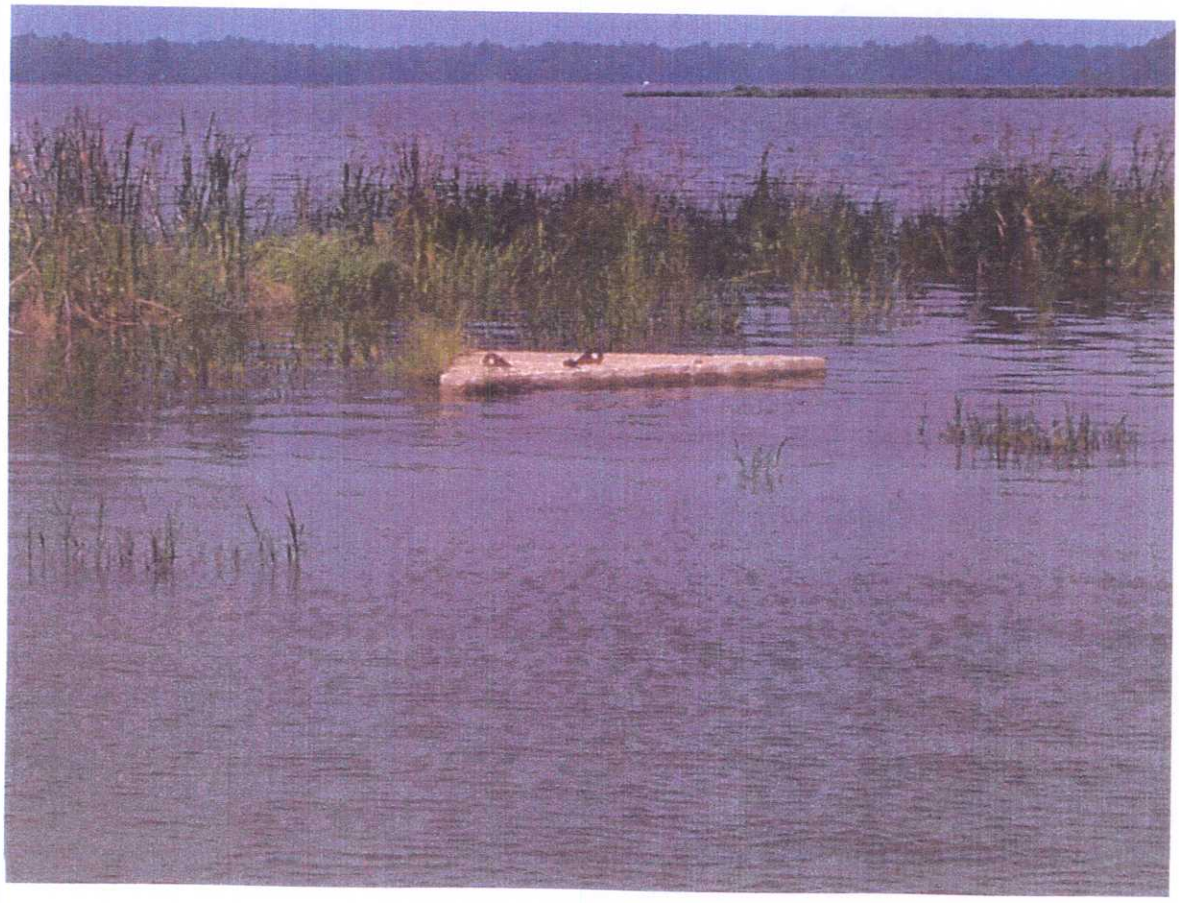
4.5 Annual Evaluation

IT Project Manager, David Tester; AFCEE Team Chief, Rodney Arnold; Keesler AFB Remediation Project Manager, Lisa Noble and AFCEE Botanist, Mary Anderson met at the archery range mitigation area on September 12, 2000 for the purpose of performing the annual evaluation of the site to determine the success of the mitigation effort. Areas of the mitigation area where observed to be bare of any plants. These areas appeared to be to deep to support the Black Needle Rush and Smooth Cord Grass plants and it was determined that the plants originally introduced to these areas had probably floated away. The plants that had survived in the mitigation area appeared to be large and health. The group determined that it would be necessary to rework some of the deeper areas where plants were missing by creating mounds and move some of the plants from the adjacent wetlands into those areas.

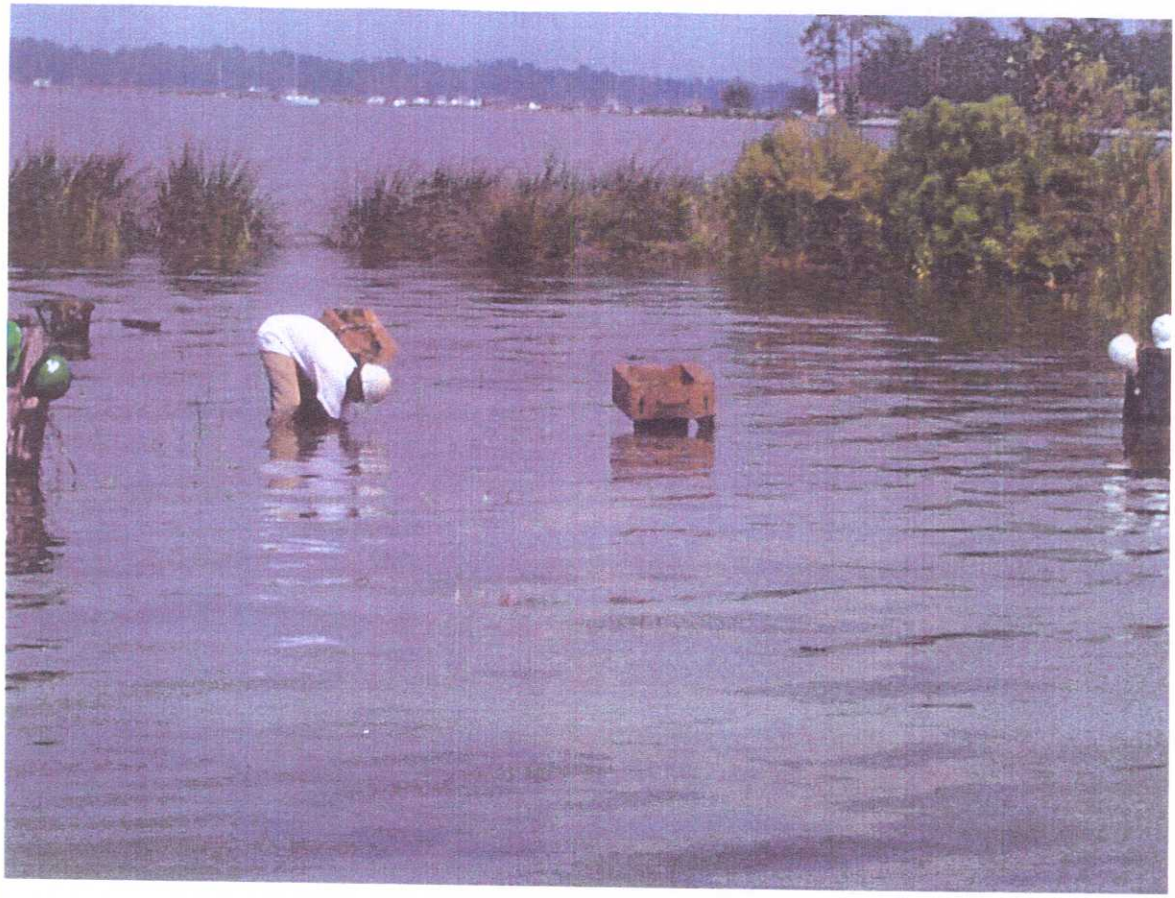
Horticultural Systems plants

Boat with plants in the mitigation area

Replanting the mitigation area



Revegetating the mitigation area



Replanting the mitigation area

Annual evaluation far end of mitigation area west side

Annual evaluation mitigation area looking toward the Back Bay

Annual evaluation mitigation area east side

Annual evaluation mitigation area west side

Annual evaluation east side of the mitigation area

Annual evaluation far end of mitigation area

Annual evaluation Site A

Annual evaluation Site A

The following summarizes the action items agreed to by the group to rework the mitigation area to make in successful:

- Excavated the berm separating an area identified as Site A to the right of the road approaching the mitigation area and use the material to create mounds in the low areas of the mitigation area and allow the tide to bring water into Site A.

- Remove cattails from Site A and save them for replanting.

- Excavate silty clay loam from Site A and use this material to cover the material excavated from the berm to create mounds. It was estimated that three (3) inches of the material from the berm should be covered with three (3) inches of the silty clay loam from Site A to create the mounds in the mitigation area.

- Collect Juncus from adjacent wetlands and split the plants into five (5) to seven (7) stems.

- Replant the Juncus in the new mounds and in the Site A area at a depth of eight (8) to ten (10) inches at high tide.

- Replant cattails around the edge of Site A.

- Schedule the completion of the rework for October.

4.6 Rework of the Mitigation Area

Mary Anderson and IT Field Superintendent, Norman Honea with his crew meet on October 10, 2000 to complete the rework of the mitigation area. October 11, 2000 IT removed the cattails in an area designated as Site A adjacent to and east of the road to the mitigation area. Site A was excavated and the material was used to build mounds in the low areas at the end of the road to the mitigation area where the water level at high tide was above that necessary to support the plants. IT graded the excavated area of Site A and replanted fifty (50) stems of *Tyha* (cattail) and eighteen (18) clumps (180 stems) of Black Needle Rush plants. IT created Sixty six (66) mounds and planted an average of two clumps of Black Needle Rush plants per mound for an additional one hundred and thirty two (132) plants (1320 stems) in the areas that were low. Another 115 plants (approximately 1150 stems) were scattered throughout the mitigation area. Because the tide was low IT was able to create hummocks in the deeper

Rework of the mitigation area with material from Site A

Rework of the mitigation area looking from the Back Bay

Rework of the mitigation area new plants

Rework of the mitigation area new mounds and plants

Rework of Site A

Rework of the mitigation area new mounds and plants

Rework of the mitigation area new mounds and plants

Rework of the mitigation area showing new plants

open water areas out past the pilings by carrying pails of sandy soil to the open areas and dumping it to form mounds. These areas were also planted with Black Needle Rush. The donor plants were removed from the marsh area directly adjacent to the mitigation area to the east side of the site.

5.0 CONCLUSION

Delivery Order Number 0089, Wetlands Mitigation for Landfill 3, successfully achieved its objective of creating wetlands as part of the required mitigation for the Landfill 3 construction project at Keesler AFB, Mississippi. These objectives were completed within the schedule specified to support the development of the Landfill 3 site and within the budget negotiated for the project.

The work was carried out with safety as its overriding intent, both for the general population of the Base and for the workers involved with the remediation activities. There were no accidents nor near accidents throughout the course of the work performed. All safety rules and regulations were followed, protecting the health and lives of the workers and the people in the general vicinity of the project. The wetlands were properly and safely restored to the satisfaction of the Air Center for Environmental Excellence Environmental Botanist.

EnviroSouth
GARY J. CUEVAS, INC.

FAXED 12/9/98

December 3, 1998

Mr. Pete Ball
Knesal Engineering
1714 22 nd Avenue
Gulfport, MS 39501

RE: Wetlands Delineation, +/-22500 Square Foot Restoration Area, Keesler Air Force Base, Biloxi, Harrison County, Mississippi

Dear Mr. Ball:

Please be advised that EnviroSouth has completed the wetland/restoration boundary delineation for the above property. Enclosed are wetland delineation data sheets completed in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual.

On December 2, 1998, EnviroSouth representatives delineated the wetlands/restoration boundary at the subject property and observed that a portion of the site contains wetland vegetation characteristic of a disturbed tidal marsh. The wetland portion observed generally adjoins filled land and is west, north and east of the old fill area. Two wetland communities, *Juncus roemeranus/Spartina alterniflora* and *Juncus roemeranus/Typha* compose the wetland area.

Soil samples were taken to a 15" to 18" depth from various locations on the property and showed both hydric and upland disturbed soils. The soil survey for Harrison County indicates the presence of Handsboro series soils on the property. The proposed restoration site is composed of sandy soils and concrete rubble and is considered fast or filled land. Soil chromas of the marsh ranged near 10YR3/1. Non-wetland chromas varied near 10YR7/3, however no significant soil horizons could be distinguished. All marsh soils were saturated within 12 inches of the surface and to the surface with some areas inundated.

RECEIVED
DEC 07 1998
Knesal Engineering
Services

Phone: (228) 388-1585 or (228) 868-2217 • Fax (228) 388-1585
6017 Vista Circle • Gulfport, Mississippi 39507-4636

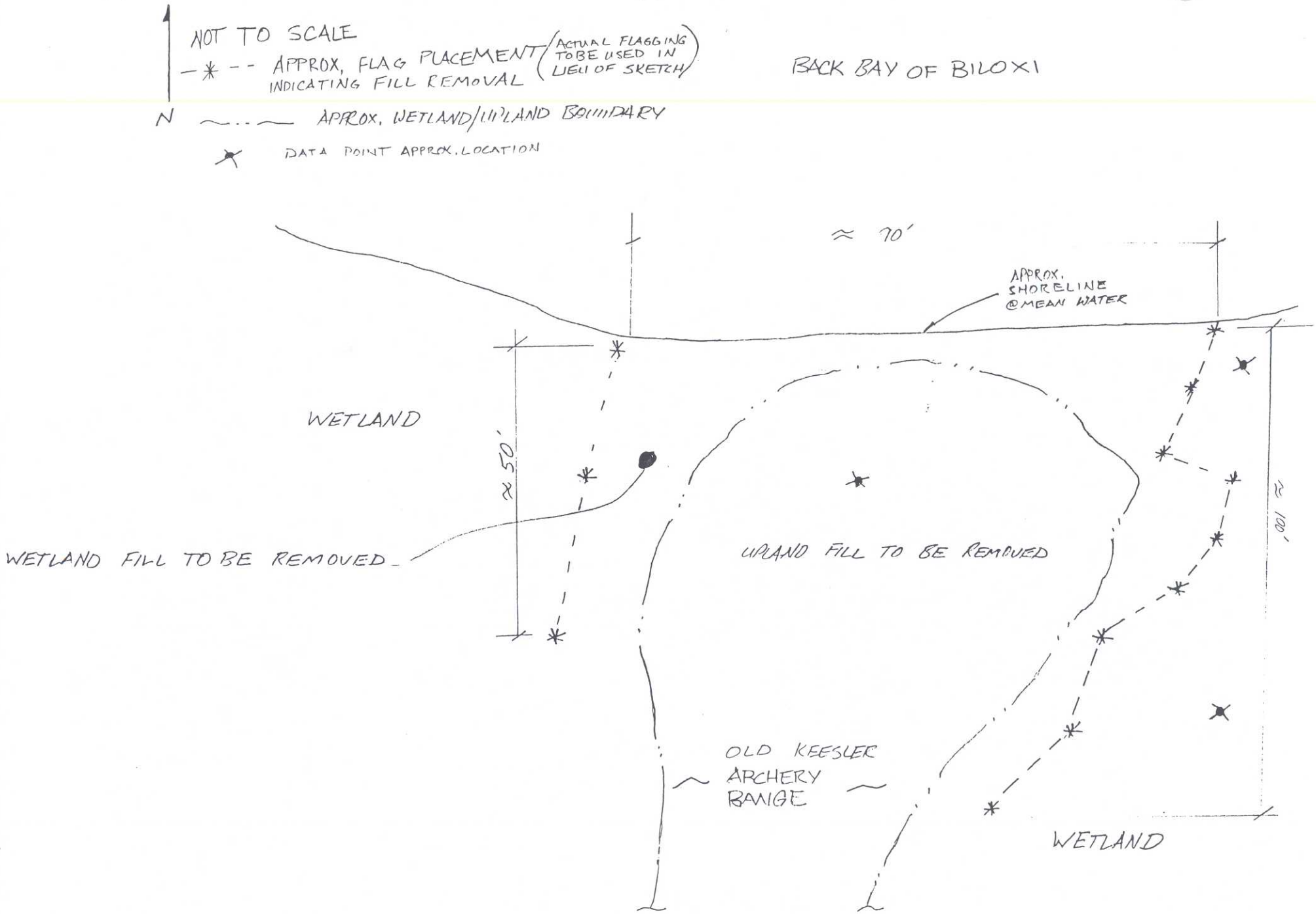
The wetland/restoration boundary is flagged with red plastic markers. Three sample plots representative of the habitat communities and hydrologic regimes were established. See attached wetland location sketch. We suggest that the final restoration project include a small first order tidal creek (non-branched) for the Spartina alterniflora planting since this species prefers lower elevations with low energy shorelines.

If you have any questions regarding this report or if I can be of further permitting or design service, please give me a call.

Sincerely,

Gary J. Cuevas
President

Enclosure


NOT TO SCALE
APPROX. FLAG PLACEMENT INDICATING FILL REMOVAL
(ACTUAL FLAGGING TO BE USED IN LIEU OF SKETCH)
N
APPROX. WETLAND/UPLAND BOUNDARY
DATA POINT APPROX. LOCATION
BACK BAY OF BILOXI
≈ 70'
APPROX. SHORELINE @ MEAN WATER
WETLAND
≈ 50'
WETLAND FILL TO BE REMOVED
UPLAND FILL TO BE REMOVED
≈ 100'
OLD KEESLER ARCHERY RANGE
WETLAND

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Leader Golf Course
Applicant/Owner: Keesler AFB - Kneisel Eng.
Investigator: Billy Culpepper

Date: 12/2/98
County: Harrison
State: MS

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: Sw
Transect ID: 2
Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Typha sp.	H	OBL
2. Juncus roemerianus	H	OBL
3. Sagittaria lancifolia	H	OBL
4. Cladium jamaicense	H	OBL
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: <1 (in.)
Depth to Saturated Soil: <1 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: 1° influence in upper 12" probably from salt canal runoff. Indicated by presence of Freshwater Typha sp.

SOILS

Map Unit Name (Series and Phase): Handsboro
Drainage Class: very poor
Taxonomy (Subgroup): Typic Sulfihemists
Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	10YR 3/1	0	0	silty loam
4-12	B	10YR 5/3	0	0	silty clay loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfide Odor
___ Acidic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks: Saltmarsh with heavy freshwater influence adjacent to fill proposed for removal for Mitigation purposes

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Keesler Golf Course
Applicant/Owner: Keesler AFB - Kneisel Eng.
Investigator: Billy Culpepper

Date: 12/2/98
County: Harrison
State: MS

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: SM
Transect ID: 1
Plot ID: 2

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Sapium Sebiferum	T	FACU+
2. Magnolia grandiflora	T	FACU
3. Morus sp.	T	UPL
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL FACW or FAC (excluding FAC-).

Remarks: Mostly have soil and accepted visible

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: >24 (in.)
Depth to Saturated Soil: >24 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Sulfaquepts (Not Mapped)
Drainage Class: Well drained
Taxonomy (Subgroup): Not Classified
Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-24	A	10YR 7/3	—	—	Sandy

Hydric Soil Indicators:
___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Acidic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks: fill and visible - very disturbed with no significant horizons

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is the Sampling Point Within a Wetland? Yes (No) (Circle)

Remarks: fill material to be removed for mitigation purposes

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Keesler Golf Course
Applicant/Owner: Keesler AFB - Kresal Eng.
Investigator: Billy Culpepper
Date: 12/2/98
County: Harrison
State: MS

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: SM
Transect ID: 1
Plot ID: 1

Saltmarsh

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Uniola paniculata	H	OBL
2. Spartina alterniflora	H	OBL
3. Sagittaria lancifolia	H	OBL
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: <1 (in.)
Depth to Saturated Soil: <1 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
X Saturated in Upper 12 Inches
___ Water Marks
X Drift Lines
X Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Handsboro
Drainage Class: Very poor
Taxonomy (Subgroup): Typic Sulfihemists
Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	10YR 3/1	0	0	silty loam
4-12	B	10YR 3/2	0	0	silty loam

Hydric Soil Indicators:
___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks: Saltmarsh adjacent to fill proposed to be removed for mitigation purposes

Approved by HQUSACE 3/91